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ABSTRACT

From ancient times, physical exercise has been linked to good mental health and positive self-concepts. To investigate the effects of weight training on self-concept, 62 college males participated in a one semester (40 hours) weight training, physical education course. Subjects were pre- and post-tested on subscales of the Tennessee Self Concept Scale (TSCS), and were asked why they chose the weight training class. A control group (N=35) of males also completed the TSCS. An analysis of the results showed that prior to weight training, experimental students exhibited significantly lower self-concept scores than did the control group. After weight training, the students showed significant positive changes in self-satisfaction, physical self and personal self. Specifically, physical self-concept, was significantly increased after weight training. Follow-up interviews did not confirm the positive changes found on the TSCS. The findings from the study suggest that an exercise program stressing the components of muscular endurance and muscular strength increases self-concept. Finally, counselors working with students who manifest low self-concept might be aware that participation in such a physical exercise program might be a useful adjunct to talking through negative self-images. (BL)

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THE EFFECT OF WEIGHT TRAINING ON THE SELF-CONCEPT OF MALE UNDERGRADUATES

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Abstract

This study examined the effect of a one-semester weight training physical education service course in changing self-concept of undergraduate males (N = 62). Subjects were pre- and posttested on selected scales of the Tennessee Self Concept Scale (TSCS) and compared to a randomly selected control group of undergraduate males (N = 35). A questionnaire was also administered to determine why students chose weight training to fulfill their physical education requirement.

Results indicated that prior to weight training, experimental students exhibited significantly lower self-concept scores than did the control students ($p < .01$).

Students who went through weight training had significant positive changes from pre- to posttesting on total and specific indices of the TSCS ($p < .01$). Posttest analysis between weight training participants and controls yielded a positive significant difference ($p < .01$) in the direction of weight training participants on the specific index of physical self-concept. Follow-up interviews did not confirm the positive changes found on the TSCS. The findings from the study suggest that an exercise program stressing the components of muscular endurance and muscular strength increases self-concept.

THE EFFECT OF WEIGHT TRAINING ON THE SELF-CONCEPT

OF MALE UNDERGRADUATES

From the ancient Greeks (Seaton, 1959) and Romans (Linsay, 1968) to the twentieth century (Wood, 1957; World Health Organization, 1947), physical exercise has been linked to good mental health. Physical fitness as a necessary adjunct to leading "the good life" has been propounded by philosophers from Plato (Adamson, 1903, pp. 145-165) to Dewey (Dewey, 1956, p. 83).

In examining body cathexis, the degree of satisfaction or dissatisfaction that an individual has with the various parts or processes of the body, Secord and Jourard (1953) found that an integral relationship exists between body image and total self-concept. Positive body image and self-concept appear to be highly correlated with good physical fitness, particularly in college students (Albinson, 1972; Cooper, 1969; Hughes, 1973; Sharp & Reilley, 1975; Sonstroem & Walker, 1973). Indeed, Collingwood (1976) has indicated that 25-35% of emotional adjustment, 25-35% of intellectual functioning, and 50-65% of physical functioning can be accounted for by the degree of physical fitness a person has.

For the male population in general, a nation-wide study (Berscheib, Walster & Behrnstedt, 1973) found that body image was consistently correlated with self-concept for males. The highest prerequisites for a good body image for males were a good looking face and a well developed chest. College males manifest such beliefs to a high degree and feel that the more mesomorphic the body type one has, the more positively enhanced one's self-concept will be (Bailey & Hankins, 1979).

Yet, the substantive research that has been done to determine whether an increase in one's physical fitness will have a commensurate increase in one's psychological fitness has been surprisingly sparse, particularly with normal populations. With the upsurge of jogging in the 1970s, most of the research that has examined psychological change as a function of physical exercise has evolved from running, or running as a major component of exercise activities. Further, such studies have typically focused on pathological populations.

Greist (1978) and Kostrubala (1977) found that neurotic and depressive subjects experienced alleviation of nervous symptoms by participation in a running program. These authors believed running to be as effective as psychotherapy for such individuals. Geriatric patients were found to be more self-sufficient (Buccola & Stone, 1975), developed increased awareness of their environment (Stamford, 1974), and had enhanced cognitive functioning (Powell, 1974) as a result of various exercise programs designed to increase cardiovascular endurance. Studies on physical rehabilitation patients (Collingwood, 1972), alcoholics (Gray & Guthrie, 1972), middle-aged, sedentary males (Ismail & Young, 1973; Young & Ismail, 1976), retarded adolescents (Brown, 1977), and obese adolescents (Collingwood & Willett, 1971) have supported cardiovascular endurance exercises as a vehicle for increasing emotional stability and intellectual functioning.

Physiological variables have also been examined in relation to psychological constructs. Anxiety neurotics demonstrated significantly poorer muscle tone (Cattell, 1960), increased neuromuscular tension (DeVries, 1975), and differential glucose and lactate levels (Stanaway &

Hillin, 1973) than control groups. These studies support findings that physical activity is needed to provide constantly changing proprioceptive stimuli necessary for normal functioning and, therefore, a "relaxed" state in the individual (Haugen, Dixon & Dickel, 1960). However, the question arises as to the possible effects of regression on reported findings, and whether results from such truncated populations can be generalized to a normal population.

Further, cardiovascular endurance is but one component of total physical fitness. Joint flexibility, muscular endurance and muscular strength have been identified as factors which contribute equally to overall physical fitness (Corbin & Dowell, 1978). Such variables have received little attention as to the effect they may have on psychological functioning in the individual. The few empirical studies that have been done on physical fitness variables of muscular strength and endurance lend credence to a close inspection of their effect on subsequent change in psychological variables. Thune (1949) found that males who engaged in weight training reported a lack of self-confidence. Bailey and Hawkins (1979) found that college males were highly concerned with the development of a more positive body image. They discerned a concomitant relationship between a mesmorphoric body build and perceived positive body image. White (1973) ascertained that total self-concept could be enhanced by increased physical fitness. The foregoing research suggests that examination of a college physical education service course devoted to weight training could provide a fruitful field in which to examine self-concept change in the college male as a function of his attempt to increase muscular endurance and strength.

Method

Subjects and Design

This study sought to determine if self-concept would increase for college males enrolled in a two-semester-hour physical education course in weight training. The course met for two, seventy-five minute periods per week throughout a sixteen-week semester. Six sections of the weight training course were solicited for volunteers in the experiment. Students were informed that they would be asked to undergo both psychological and physiological testing not normally done in the course. They were further told grades would not be affected in anyway by their decision to participate or not participate. It was further stated that the only added inducement would be a certificate of participation and a five dollar incentive for those who completed all phases of the program. Of a total of 102 students available, 62 males volunteered and signed an agreement to participate.

A control group of 35 males was randomly selected from introductory Career Development classes offered by the Counseling Department at Memphis State University. The Career Development course was chosen as a control because of its student population whose variety of major and year in school closely resembled a physical education service course. Additionally, students enrolled in the career development course represented a sample which approximated demographic characteristics of the total undergraduate population.

Procedures

All experimental students were pretested on the Total P, Self Satisfaction, Physical Self, and Personal Self subscales of the Tennessee Self-Concept Scale (TSCS) (Fitts, 1965). Definition of the scales is:

> Total P. This scale reflects the individual's overall level of self esteem. Individuals with high scores tend to like themselves, feel that they are persons of value and worth, have confidence in themselves, and act accordingly. Individuals with low scores are doubtful about their own worth, see themselves as undesirable, often feel anxious, depressed and unhappy, and have little faith or confidence in themselves.
>
> Self Satisfaction. This scale describes how the individual feels about the self he perceives. The scale reflects the individual's level of self satisfaction or self acceptance.
>
> Physical Self. This scale describes how the individual perceives his body, his state of health, his physical experience, skills, and sexuality.
>
> Personal Self. This scale reflects the individual's sense of personal worth, his feeling of adequacy as a person and his evaluation of his personality apart from his body or his relationships with others (Fitts, 1965, pp. 2-3).

In addition, experimental students were given a questionnaire to determine why they signed up for the course, their experience in weight lifting, and what they expected from the course. The questionnaire,

along with percentages of responses to each question, is detailed in Table 1.

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Insert Table 1 about here

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Supplementary data from the questionnaire indicated that 77.4% of the students had worked out with weights before the course, but only 15.5% of the students indicated they were on an exercise program at the time of enrollment. Only 18.3% of the students indicated participation in intercollegiate or intramural sports. The mean age of students was 20.01. Division by class standing was: freshman, 57.7%; sophomore, 25.3%; junior, 5.8%; senior, 7.0%; graduate, 4.2%.

The experimental exercise regimen commenced with four minutes of stretching and general warm-up exercises. Stretching exercises emphasized movements for stretching the major muscle groups. Warm-up exercises consisted of: full-body movements like jumping-jacks, squat jumps, running in place, and various hopping dance steps designed to elevate general body systems and specific body movements such as push-ups, squat jumps, and "jack-knife" abdominal exercises to duplicate the exact movements to be used during the experimental part of the class.

Because of the variety of different weight lifting modalities available students were randomly divided into five different groups for the bench press lift. These groups were: isotonic free bar (barbells), isotonic fixed bar (Universal-Gym), isokinetic free bar (Mini-Gym 500X), isokinetic fixed bar (Hydro-Gym), and semi-isokinetic fixed bar (variable resistance Universal Gym). In each of these groups six sets were

done by each participant with 1 minute and 40 seconds between each set. Taped commands were used to standardize the intervals between lifts and between sets. In the Free Weight, Universal-Gym, and V.R. Universal-Gym groups the first set was a warm-up set using 75% of the repetition maximum (RM). Sets two, three, four, five, and six used 100% of the RM. Six repetitions were used in sets one through five, while set six consisted of as many repetitions as possible. When nine repetitions could be performed in set six, the RM was increased by five pounds. In the Mini-Gym and Hydro-Gym groups, because the equipment is isokinetic so that the resistance matches the effort exerted, all sets consisted of six repetitions. Set one was an effort approximating 75% of RM and sets two through six were an all-out effort.

The experimental group did no other upper body pressing or chest exercise except the bench press. Resistance movements that involved pulling, extending the trunk, extending the leg and flexing the leg were emphasized during the remainder of each class period. Also, some work was done on jumping rope, stool stepping, and bag hopping.

Results

At the conclusion of the weight training course, both the experimental and control groups were posttested on the TSCS. A pretest was administered to the experimental group to determine basal self-concept prior to the procedure. This was done because the experimental group could not be considered to be randomly chosen in comparison to the total student population. A summary of the TSCS means for groups and tests is reported in Table 2.

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Insert Tables 2 & 3 about here

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Correlated *t* tests were conducted between pre- and posttest experimental group TSCS scores. Significant positive differences in the direction of posttest scores for the experimental group were found for Total P, t (62) = 4.50, $p < .01$; Self Satisfaction, t (62) = 2.69, $p < .01$; Physical Self, t (62) = 4.81, $p < .01$; Personal Self, t (62) = 3.70, $p < .01$.

Independent *t* tests were conducted between pretest experimental and posttest control group TSCS scores to determine equivalence of group means. Significant differences in the direction of the control group were found on Self Satisfaction, t (62,35) = -3.17, $p < .01$; Physical Self, t (62,35) = -4.69, $p < .01$; and Personal Self, t (62,35) = -2.82, $p < .01$. The Total P score approached but did not attain significance.

Independent *t* tests were conducted between posttest experimental and posttest control group TSCS scores. A significant difference in the direction of the experimental group was found for Physical Self, t (62,35) = 2.92, $p < .01$. Other scales tested did not reach the criterion level of $p < .05$.

Discussion

Results from this study suggest that students who select weight training do differ significantly in negative ways on various facets of self-concept when compared to a random sample of other college students. Such low self-concept scores of experimental students lend support to

Thune's (1949) finding that individuals who elect to participate in weight training have negative self-images.

It would seem that the gains experienced by experimental students take on added significance as a result of their low basal self-concept scores. Conversion of the experimental students' raw scores on the pretest to percentiles indicated that all of the selected scales of the TSCS were at the 50th percentile or below: Total P = 31st percentile, Self Satisfaction = 38th percentile, Physical Self = 21st percentile, and Personal Self = 51st percentile. The percentile conversions for the posttest TSCS scales demonstrate the degree of gain of experimental students when compared to the TSCS norms: Total P = 60th percentile, Self Satisfaction = 58th percentile, Physical Self = 70th percentile, Personal Self = 70th percentile. Thus, experimental students changed from a general self-concept that was below average in comparison to TSCS norms to a general self-concept that was above average.

Of particular significance is the Physical Self scale. If it were hypothesized that one particular component of self-concept would change as a result of the treatment, it would be the Physical Self scale because of its apparent relationship to weight training. Such a positive change was obtained as evidenced by the significant pre- to posttest difference within the experimental students and the significant posttest difference between the experimental and control students. This research suggests that weight training does have a pronounced effect on students' physical perception of themselves, and, to a lesser degree, total self-concept, self satisfaction and personal satisfaction.

The initial questionnaire given to experimental students was used as the basis for a posttreatment interview. The interview provided interesting but conflicting results with data obtained from the TSCS. While there was grudging acknowledgment that muscular strength and endurance had increased, experimental students tended to denigrate their progress and few were satisfied with their gains. Even for students who had made outstanding progress in strength and endurance measures, they acknowledged little success.

On other aspects of the questionnaire, even less positive responses were generated, particularly in regard to body image and mental well-being. It appears that gains acquired from participation in this weight training physical education course, whether physical or psychological in nature, seem to be uniquely expressed on a nonverbal level. That is, it appears that positive verbal feedback concerning one's progress, or perhaps one's fear of receiving negative verbal feedback goes against the body building "ethic," particularly when one starts out with a negative self-concept.

Positive feedback in weight training seems to take the form of internal responses to external situations. While some students, when pressed, stated in a vague way that they "felt better," they had difficulty in pinpointing what "better" was. It may be that students were somewhat constrained in talking about themselves to a sign.ficant other--a professor. However, observationss of the students during the course of the experiment indicated little positive feedback from peers, or solicitation of feedback by the students from their peers. The

feedback that could be observed was the increasing incidence of stopping in front of the weight room mirror as the students progressed through the course.

From both observation and interview, it was the opinion of the researchers that regardless of gain students made in muscular strength or endurance, they seemed unable or unwilling to verbally own the gains. The students further seemed unwilling or unable to verbally own that they had accomplished or even made much progress as to goals they had listed in Table 1. Yet, when given a less obtrusive measure such as the TSCS, the effects of weight training with respect to increased self-concept seem clear in regard to the results of this research.

The present study tends to substantiate previous work done on exercise type and self-concept. Hilyer and Mitchell (1979) found that running as an exercise variable alone did not change total self-concept and particularly physical self-concept in college students. However, when running, joint flexibility, muscular strength and muscular endurance exercises were combined with discussion sessions about the effects of the exercise regimen, positive self-concept changes did occur in experimental students (Hilyer, Jenkins, Deaton, Dillon, Meadows, & Wilson, 1980).

The results from the present study and the work reported by Hilyer et al. (1980) indicate that physical conditioning has positive effects on individual self-concept. However, it would seem a combination of cardiovascular, joint flexibility, muscular strength and muscular endurance exercises are needed if increased positive self-concept is to occur.

Results of this study should be viewed within the following limitations:

1. The exercise regimen in this study was conducted twice weekly and was conducted as a typical one-semester physical education service course. A more strenuous weight training program carried on with increased frequency and over a longer period of time might produce different effects on self-concept.

2. While the experimental students increased both their muscular endurance and strength from the beginning to the end of the course (James & Ellsworth, 1981), no direct correlation between strength increase in specific students and concomitant self-concept scores was obtained. Thus, it cannot be determined whether experimental students experienced increased self-concept from actual strength gain, perceived strength gain, or from completing a strenuous and demanding physical education course. It would seem important to examine this variable in a more discrete manner by correlating degree of strength and self-concept gain in individual students.

3. While Hilyer and Mitchell (1979) did not find self-concept increases when running was used as a sole exercise variable, significant increases in self-concept were found when physical exercise was combined with counseling sessions that discussed the effect of exercise on the individual (Hilyer et al., 1980). From the interviews conducted in this study, verbal expression and facilitation of feelings of negative self-image through a group counseling format may further enhance positive self-concept.

4. No follow-up study was conducted on the experimental students as to continued participation in weight training or maintenance of self-concept gain. If a conclusion is to be justified that a strenuous exercise activity such as weight training has lasting effects on the self-concept of participants, long term follow-up is needed.

The results of this study lend support to a physical fitness program that emphasizes muscular strength and muscular endurance. The findings support the long-held contention that a positive relationship exists between a "healthy mind and healthy body" (Seaton, 1959; Wood, 1957).

While the primary purpose of weight training may be to increase muscular strength and endurance, teachers of such courses should be aware that other internal psychological effects are occurring within students, and that such psychological effects may be as important as the physical effects these courses promote.

Finally, counselors who are working with college students who manifest low self-concept should be aware that a treatment adjunct to "talking through" negative self-images might include participation in a physical exercise program that includes components of joint flexibility, muscular strength and muscular endurance.

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Table 1

Personal Data for College Males Enrolled in Weight Training[a]

Reason for Taking Weight Training	Percentage of Students Responding
To add muscle	82.2
To increase muscular strength	80.6
To firm up and tone up	69.3
To improve total body image	64.5
To feel better physically	62.9
To increase muscular endurance	58.0
To increase heart-lung endurance	45.1
To lose weight in some areas and gain weight in others	40.3
To feel better mentally	40.3
To increase flexibility	33.8
To gain weight	25.8
To lose weight	18.3
To relax	17.7
Other (mainly job related)	16.1
To excel in sports	8.0
To rehabilitate an injury	4.8

[a] $n = 108$.

Table 2

Tennessee Self Concept Scale Means for Weight Training and Control Students

Subscale TSCS	Pretest Weight Training	Posttest Weight Training	Post Controls
Total P	339.21	354.42	346.28
Self Satisfaction	102.81	107.93	109.30
Physical Self	65.57	75.90	70.69
Personal Self	66.54	70.00	69.00
	(N=62)	(N=62)	(N=35)

Table 3

Tennessee Self Concept Scale *t* Ratios for Weight Training and Control Students

Subscale TSCS	Pre-Posttest Weight Training	Pretest Weight Training-Posttest Controls	Posttest Weight Training-Posttest Controls
Total P	4.50*	-1.82*	1.02
Self Satisfaction	2.69*	-3.17*	- .34
Physical Self	5.70*	-4.69*	2.92*
Personal Self	3.70*	-2.82*	.63

*$p < .01$.